STOCK MARKET REACTION TO MEGA-SPORT EVENTS: Evidence from South Africa and Morocco

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Abstract

This article investigated the stock price reaction to the news of South Africa's winning the opportunity to host the 1995 Rugby World Cup, 2003 Cricket World Cup, and 2010 FIFA World Cup, as well as Morocco's concurrently losing a competitive bid to host the 2010 FIFA World Cup. We used Event Study Methodology, and EGARCH models. In Event Study, the normal market performance is evaluated using 250 daily stock returns in the pre-event period, while abnormal returns are tested within a 41-day (-20, +20) event window. The test was replicated using 2 227 daily compounded stock returns for the EGARCH model to re-test the stock market reaction to the news of hosting the 2010 FIFA World Cup for bid winner (South Africa) and bid loser (Morocco). On aggregate, based on both the Event Study and EGARCH models, our findings convey a consistent message that the stock market responded positively to the hosting of mega-sport events for the bid winner (South Africa), and reacted negatively to the bid loser (Morocco). The results are statistically significant at conventional test levels. The findings support policy decisions that welcome mega-sport events.

Key Words: Efficient market hypothesis, event study, EGARCH, mega-sport, stock market.

Introduction

> *Hosting a major international event like the FIFA World Cup bestows a country and its government with status, prestige, influence, power and foreign investment* (Van Wyk, 2008, p.2)

The news that a country has won a competitive bid to host a major international sport tournament is considered unanticipated information, since no one has prior knowledge of the bid outcome (or winner) until the decision envelope is opened publicly on the announcement day. Similar to the release of other economic indicators, Godinho and Cerqueira (2018) has confirmed that unexpected sport outcomes have potential to induce stock market reactions. In order to study the stock market's response to the announcement of hosting mega-sport events in South Africa and Morocco, this article applied the efficient market hypothesis (EMH) of Fama (1965, 1970, 1991); the theory of rational expectations (Muth, 1961); the stock returns' predictability hypothesis (Golez & Koudijs, 2018); and Event Study Methodology, comprehensively reviewed by MacKinlay (1997).

Prior to 1995, no World Cup tournament in rugby, cricket or soccer had been hosted in Africa, let alone in South Africa, despite the continent's active participation in these sports. Since then there has been a change of mind-set by international sport bodies with a new policy decision to promote sport beyond the usual hosting venues of Europe, North America, Asia, and Latin America. A recent research momentum has enquired whether such a decision is a pure public relations gesture or whether the financial markets discern potential value-add from the hosting of mega-sport events.

The Mega-Sport Event and World Cup Competitions

The literature on sport hosting has consensus on which sport tournaments are categorised as mega or major sport events. There are key features associated with mega-sport events, such as intensive global media coverage, as noted by Kaplanski and Levy (2010); expected socio-economic benefits, as reported by Cornelissen (2004) and Dollesa and Söderman (2008); as well as other measurable or perceived economic spill-overs as explained by Allmers and Maennig (2009), Antón, Alonso, and Rodríguez (2011); Gratton, Shiblik and Coleman (2006), Hill (2000), Kasimati (2003), Nauright (2004), as well as Roche (2000). In view of the above, and for the purpose of this study, mega- sport events include the Rugby World Cup 1995, Cricket World Cup 2003, and FIFA World Cup 2010.

FIFA, the French abbreviation of the *Fédération Internationale de Football Association,* is an international soccer governing body well known for the administration of its prestigious

brand, the FIFA World Cup. The FIFA World Cup was inaugurated in 1930 with Uruguay as the first host country. Since then the tournament has been held every four years, with only two cancellations, in 1942 and 1946, owing to World War II. By 2026, the FIFA World Cup will have been hosted in twenty-two countries, once in Africa (South Africa), thrice in Asia (Japan/South Korea, Russia, and Qatar), and the rest in Europe, or the Americas. Africa's long history of participation in the FIFA World Cup tournaments dates back to 1934 when Egypt reached the top 16 match finalists in Italy.

After the 2002 tournament, FIFA changed the rules for hosting the tournament. An exhaustive ballot system is now used. In addition, a continent rotation procedure was also introduced in 2000 and subsequently reversed in 2007 (FIFA, 2002, 2007). Consequently, Africa was one of the few continents that benefited from the brief rotation system. South Africa and Morocco were among the countries that submitted competitive bids to host the 2010 FIFA World Cup, and Morocco lost to South Africa.

The Rugby World Cup (in its present format) has been held since 1987, and by the year 2019 it will have been hosted by eight countries on four continents (Australia, Asia, Europe, and Africa). The tournament was hosted in Africa (South Africa) in 1995 for the first time since its installation, and South Africa won the Cup twice (in 1995 and 2007). The Cricket World Cup is an international championship of One Day International (ODI) cricket, and is governed by the ICC (International Cricket Council). In the period 1975 to 2023, thirteen Cricket World Cups will have been played in six countries: Australia (1992, and 2015); England (1975, 1979, 1983, 1999, and 2019); India (1987, 2011, and 2023); Pakistan (1996); and the West Indies (2007) – in no particular order. The hosting procedure for the Cricket World Cup appears to be by method of negotiated rotation, and not competitive bidding. The championship winning is dominated by Australia (five occasions), and the hosting mostly by England (five opportunities), while Africa (South Africa) hosted the tournament only once, in 2003.

Why Stock Markets Respond to the News of Hosting Mega-Sport Events?

In order for a country to win a competitive bid to host a major international sport event, such as the World Cup in soccer, rugby, or cricket, the country must satisfy a costly logistical checklist with additional expensive sweeteners. It is perhaps for this reason that an announcement to win such a bid creates the expectation of possible socio-economic benefits to the host country. The rationale of associating the hosting of mega-sport events with possible benefits to domestic economy is premised on the perceived positive economic knock-on effects linked with the necessary and extended logistics preparation. Examples

include improvement in safety measures, communication technology, global country profiling, as well as large capital expenditure on event-related infrastructure.
Although the research on the effect of hosting of mega-sport events is inconclusive, there is some favourable anecdotal evidence from global experience with positive results as surveyed by Bohlmann and Van Heerden (2008): Los Angeles Sports and Entertainment Commission estimated US$32.2 million economic benefit from hosting the Olympic Games of 1984. The Australian URS Finance and Economics found that the Rugby World Cup 2003 generated a contribution to GDP of AU$289 million; while the Australian Centre for Regional Economic Analysis estimated the economic benefit of hosting the Sydney 2000 Olympic Games would contribute AU$6.5 billion to GDP.

Dick and Wang (2008) applied Event Study Methodology to evaluate the impact of announcements to host 15 Olympic Games. They found a significant positive impact on hosting Summer Games. This is consistent with Sharma's (2010, p. 1027) finding that "countries and cities campaign actively for the rights to host major international sport tournaments in part because of their view that the tournaments are beneficial to their local economies. The announcement implies promised investments on infrastructure and other projects and consequently positive economic activities". On the contrary, a recent study by Engelhardt, Matheson, Yen, and Chisolm (2018) tested an extended data set of Olympic Games (summer and winter) for the period 1981 to 2013 and found no stock market reaction to the announcement of hosting bids for both winners and losers.

In view of the above, the hypothesis that the hosting of mega-sport events conveys relevant information to stock prices remains an empirical question that requires evidence from stock markets around the world including Africa, and covering different kind of sports. This type of investigation is particularly important in the value-add chain to understand the stylised facts in this research area, of event-hosting's effect on stock markets.

Hosting Mega-Sport Events and Global Stock Markets

The appreciation of the stock market reaction to mega-sport events is one of the value-add applications of the EMH and a useful research link between sport economics and financial markets. Unfortunately, a review of the relevant literature shows that this research has been directed mostly at the traditional hosting of mega-sport events continents like Australia (Berman, Brooks, & Davidson, 2000; Nishio, Lim, & Downward, 2009); Europe (Dawson, Kasimati, & Veraros, 2004; Floros, 2010; Leeds, Mirikitani, & Tang, 2009; Martins & Serra, 2011; Sterken, 2006); Asia (Dick & Wang, 2008; Liu, 2011); North America (Baade,

Baumann, & Matheson, 2008), to mention a few. This research needs to be extended to African stock markets.

The only papers in South Africa that we are aware of that investigated the reaction of the stock market to the news of South Africa's hosting of major sport events (the 2010 FIFA World Cup) are Obi, Surujlal, and Okubena (2009); and Ramdas, Van Gaalen, and Bolton (2015). The two papers found contradictory results. Obi et al (2009) found insignificant results. That is, zero stock price reaction, while Ramdas et al. (2015) found negative stock market reaction. This means that with this limited, and inconsistent findings, the question remains: Does the South African stock market respond to the hosting of mega-sport events? If so, what is the nature of this reaction? The presence of these unanswered questions signal a research gap and the current study will broaden the relevant empirical test in an effort to address this research question.

Our paper is similar to that of Smith and Krige (2010), in that we examined the same major sport tournaments (1995 Rugby World Cup, 2003 Cricket World Cup, and 2010 FIFA World Cup), but dissimilar in that we did not study 'investor mood' but 'hosting effect'. The current article is also similar to those of Obi et al. (2009) and Ramdas et al. (2015), as all investigated the hosting of mega-sport events effect' on the Johannesburg Stock Exchange (JSE) stock market, but dissimilar in that the prior papers each examined just one major sport event for South Africa (2010 FIFA World Cup), while our article investigated three World Cup tournaments in South Africa (rugby, cricket and soccer). We see our article as an improvement on prior papers, as we introduced a methodological improvement to Obi et al. (2009) by increasing the sample size from 25 to 250, and broadened the study of Ramdas et al. (2015) by increasing the number of individual sport events from one to three and including different sports.

The rest of this paper is proceeds as follows: The next section discusses the theoretical framework, followed by literature review of mega-sport hosting. Thereafter, the fitted econometric model is outlined, and then a description of the data set is provided. The report of empirical results is followed by a discussion to reconcile the investors' *ex ante* expectations with the World Cup's *ex post* impacts. The paper wraps up with a conclusion along with a perspective on policy implications.

Theoretical Framework

Event Study Methodology is anchored on the EMH, rational expectations hypothesis, and the concept of returns predictability. The economic intuition of EMH is rooted in the pioneering work of Fama (1970, p. 383), who since the early 1960s has preached a very simple sermon that an efficient market is "…a market in which prices always fully reflect available information". This simple message culminated in Fama's co-winning the 2013 Economics Nobel Prize. For example, if an announcement to host a major international sport tournament generates relevant information for stock markets, then the impact of such information should be fully and immediately reflected in the stock prices, assuming the market is efficient. Available information refers to any piece of information that has the potential to have an impact on a company's listed stock prices. The notion of 'available information' may include financial variables from listed companies, such as the declaration of a dividend, appointment of a new chief executive officer, or macroeconomic factors like interest rates' movement and even industrial action.

Fama (1970) categorised market efficiency into three classes: weak-form efficiency, semi-strong form efficiency, and strong-form efficiency. A weak-form efficiency hypothesis states that the information on past prices and trading volume is already reflected in security prices. The semi-strong efficiency hypothesis says that in addition to historical information, prices also reflect all publicly available information. The strong-form efficiency hypothesis claims that in addition to the semi-strong information content, prices contain all privately available information. According to the EMH theory, if the market is efficient, security prices are stable before announcement of new relevant information. Upon release of the unanticipated information, prices react immediately. In theory, if the information is relevant, the prices should jump upwards (positive impact) or jump downwards (negative impact). In practice, the market may take time before the reaction, or react early, or overshoot or under-react. If the market is *Fama-efficient*, there should be no overshooting, early, delayed or under reactions. There should be an immediate unambiguous jump and a subsequent stable performance.

Jensen (1978) has long argued that in reality, the strong-form efficiency is probably not achievable but it is an ideal standard for EMH. This phenomenon is better explained by the Grossman–Stiglitz paradox, which points to the non-existence of a competitive equilibrium. Grossman and Stiglitz (1980, p. 393) argue that there is an equilibrium degree of disequilibrium. By this they mean that "prices reflect the information of informed individuals but only partially, so that those who expend resources to obtain information do receive

compensation". The logical conclusion of this argument is that in the real world, agents are not equally informed, simply because the collection and interpretation of information is costly. Therefore markets are most likely to be efficient at weak and semi-strong forms of efficiency. In tandem with the Grossman–Stiglitz paradox, Fama (1991, p. 1575), reviewed his EMH paradigm and clarified his thoughts further: "Since there are surely positive information and trading costs, the extreme version of the market efficiency hypothesis is *surely false***"** (italics indicate authors' emphasis). The common findings of the literature on EMH empirical tests agree that markets are semi-strong efficient and not strong-form efficient (Bacon & Von Gersdorff, 2008; Samitas & Kenourgios, 2004). The same results were confirmed with studies based on the South African Johannesburg Stock Exchange (Mlonzi, Kruger, & Nthoesane, 2011, Philpott & Firer, 1994), while supportive results were reported for other African stock exchanges, including Morocco (Smith & Dyakova, 2014).

The theory of rational expectations, first introduced by Muth (1961), provides a basis to explain in part why stock market investors react to the breaking news that a country has won a bid to host a major international sport tournament. In order to evaluate whether the market will react to the release of new information, there is a need to predict what the returns will be in the absence of new information and to compare these with the returns performance in the presence of new information. It is for this reason that the question of returns predictability is also relevant. Event study researchers (Brown & Warner, 1980) maintain that security price performance may only be considered 'abnormal' relative to a specific benchmark. Therefore, it is necessary to specify a model to predict normal returns in the absence of new information. A model that is commonly used, also applied in this study, is Event Study Methodology first used by Dolley (1933) and then developed to modern framework by Fama, Fisher, Jensen, and Roll (1969). Prior to modelling the 'normal versus abnormal' returns, we first surveyed the state of research of the stock market response to the hosting of mega-sport events.

Event Studies of Major Sport Tournaments

The basic objective of sport tournament event studies in relation to stock markets is to analyse the effects of a particular tournament on a host country's stock market. The event studies of mega sports may be classified in two categories. First, studies that analyse the impact of change in 'investor mood' on stock returns as a result of a win or lose by a domestic sport team as noted by Edmans, Garcia, and Norli (2007), Benkraiem, Louhichi, and Marques (2009), Allmers and Maennig (2009), Kaplanski and Levy (2010), and Martins

and Serra (2011), as well as Payne, Tresl, and Friesen (2018). Second, studies that investigate the effect of hosting mega-sport events on stock markets such as Dick and Wang (2008), Nishio et al. (2009), Sharma (2010), Liu (2011), Leeds et al. (2009), Martins and Serra (2011), as well as Engelhardt et al (2018). The current paper resorts in the dimension of the second set of studies. While the global research outcomes in this area seem to yield mixed results, there is a discernible pattern emerging in the research findings with respect to stock markets' responses to the hosting of mega-sport events in developing countries.

Stock Market Reaction to the Hosting of Mega-sport events *in Developing Countries*

The literature reveals that the stock markets of developing countries are more likely to be impacted by announcements to host major sport tournaments, compared with stock markets in developed countries (Dick & Wang, 2008, Nishio et al., 2009). Normally, developed countries require less capital investment in infrastructure improvements compared with developing countries, simply because their existing infrastructure capacity is likely to be sufficient to stage such mega tournaments. In 1994, USA hosted the World Cup without a need to build a single additional stadium, and all existing stadiums were deemed satisfactory by the compliance inspectors of FIFA. Infrastructure improvements normally include, inter alia, the building of stadiums, and improvements to road systems and ports of entry structures.

Nishio et al. (2009) employed Event Study Methodology to compare the impact of the announcement on countries that hosted the Olympic Games between 1998 and 2004. The stock markets of the host countries varied from the developed economies of the USA, Japan, and France, to the developing economies of South Korea and Greece. Their results showed a positive impact on the stock markets in the lesser developed Greece and South Korea. In contrast, the more developed Japan and France experienced little to zero impact. Further, the authors found that Greece was negatively impacted when it lost its bid to host the 1996 Olympic Games, while the USA stock market responded positively to a loss. However, the stock markets in France, China and Italy were not impacted when those countries lost their bids to Spain, Australia and Greece in 1992, 2000 and 2004 respectively. Similarly, no stock market impact was observed for the Olympic Games hosted in 1992 and 2000 by Spain and Australia respectively.

Sharma (2010) used Event Study Methodology to analyse stock market reactions to hosting of mega-sport events in four developing countries of Asia namely, Pakistan, India, Sri Lanka, and Bangladesh, following the hosting announcement of the 2011 Cricket World Cup

matches. Their results showed a positive reaction by all stock markets. These results convey a persuasive case that stock markets in developing countries are more likely to respond positively to the hosting of mega-sport events owing to the perceived infrastructure improvement opportunities in local economies. If this explanation is accepted, what is the meaning of cases where stock markets respond negatively to the hosting of mega-sport events, including developing countries?

Stock Markets React Negatively to Inefficient hosting of mega-sport events

The stock market in China was impacted negatively when China won the bid to host the 2008 Olympic Games (Leeds et al., 2009, Liu, 2011). Stock market investors in China perceived the economic activities associated with hosting the 2008 Olympic Games not to be optimally used, hence the negative reaction. The market view seems to be that resources should have been expended on other economic activities, rather than overspending on event preparation such as was the case in China. Leeds et al. (2009) reported that China spent $40 billion as part of upfront tournament preparations for the 2008 Olympic Games, which is $12 billion more than what Greece spent in the 2004 Olympic Games, and $1.7 billion more than what Australia spent on their hosting of the 2000 Olympic Games.

In view of the above, it is evident that the empirical research findings regarding the hosting of mega-sport events are mixed, but appear to lean more towards positive stock market reaction. Martins and Serra (2011) used Event Study Methodology to analyse 81 announcements (a rare large sample size) to host Olympic Games, FIFA World Cups, and European Football Cups between 1955 and 2003. Their aggregated conclusions were that, on average, the announcements had a positive price reaction.

Methodology

The Study Hypotheses

The research question sought to establish whether an announcement to host a major international sport event would cause domestic stock prices to react positively, negatively or to not respond.

Hypothesis Test 1: How does the stock market respond to the bid-winner for hosting the sport event? We tested the null hypothesis (H_0) that the announcement of the decision to host each of the three world cup events, the 1995 Rugby World Cup, 2003 Cricket World Cup, and 2010 FIFA World Cup in South Africa had zero price reaction from the South

African stock market against the alternative (H_A) that there was a price reaction. If H_0 is rejected, we conclude that there is significant statistical evidence to support the finding that the announcement of the decision to host the relevant tournament in South Africa is associated with stock price reaction.

Hypothesis Test 2: How does the domestic stock market respond to the news of bid-loser for hosting a sport event? We tested the null hypothesis (H_0) that the announcement of losing a bid to host the sport event had zero stock-price reaction against the alternative (H_A) that there was a price reaction. If H_0 is rejected, we conclude that there is significant statistical evidence to support the finding that the announcement of losing a bid to host a sport event has some effect on the stock market. This test was applied to the Moroccan stock market, since Morocco lost the bid to host the 2010 FIFA World Cup to South Africa.

Other tournaments (1995 Rugby World Cup, and 2003 Cricket World Cup) did not have bid losers owing to the negotiated bidding process at the time. The 1995 Rugby World Cup was awarded to South Africa after all international sanctions were removed in the early 1990s. Regarding cricket, South Africa initially bid for the 1996 Cricket World Cup. However, a deal was reached whereby all the other bidders would have a chance to host a Cricket World Cup in succession. Sri Lanka, India and Pakistan hosted the 1996 World Cup first, followed by England who hosted the1999 World Cup. South Africa hosted the 2003 World Cup.

Econometric Model 1: Event Study Methodology

The Event Study Methodology used in the current study has wide applications in financial economics and other fields, including mergers and acquisitions (Hayward, 2002); earning announcements (MacKinlay, 1997); corporate reorganisation (Lee, 2001); investment decisions (Kun, Dow, & Grover, 2001), as well as political events (Cheng, Kang, & Tzeng, 2011), among others. Historically the application of Event Study Methodology may be traced to the 1930s, where initially empirical investigation was mainly the price effects of stock splits. The level of econometric sophistication has since increased in the methodology of event studies. Kothari and Warner (2006) noted more than 565 event studies between 1974 and 2000 published in five leading financial economics journals. Corrado (2011) observed that this survey by Kothari and Warner (2006) was conservative, as it excluded many event studies published in accounting and other financial journals. Among recent researchers that reviewed Event Study Methodology, MacKinlay (1997) has extensively validated optimal model specifications, and his valued recommendations are followed in the present article.

The basic analytical objective of Event Study Methodology is to compare the expected stock performance (called normal performance), and unexpected stock performance (called abnormal performance), which is introduced by the release of new information. The econometric model was estimated and tested using Equations 1.1 to 1.5. The abnormal returns equation is defined as follows:

$$AR_{it} = R_{it} - E[R_{it}|X_{t-1}] \qquad (1.1)$$

$$AR_{it} \sim N(0, \sigma_i^2)$$

The abnormal returns (AR_{it}) are assumed to be independent and identically distributed (i.i.d) normal, and represent the unexpected error of the expected return model. Thus, the abnormal return is assumed to have a mean of zero and a constant variance. It is estimated as the difference between actual returns (R_{it}) of market index i at event day t and the expected returns $E[R_{it}|X_{t-1}]$ conditional on X_{t-1}, the information set for the normal performance model. Actual returns are computed in Equation 1.2:

$$R_{it} = ln(P_{it}) - ln(\mathrm{P}_{\mathrm{it-1}}) \qquad (1.2)$$

The variables, P_{it} and $\mathrm{P}_{\mathrm{it\text{-}1}}$ represent daily current and lagged stock market index, respectively.

MacKinlay (1997) recommends two sets of econometric specifications for computing normal performance: statistical models (Constant Mean Return (CMR) Model, or Market Model) and economic models such as, Capital Asset Pricing Model (CAPM) by Lintner (1965) and Sharpe (1964), or Asset Pricing Theory (APT) by Ross (1977). The statistical models follow from statistical assumptions of asset returns and do not depend on any economic arguments. The models assume that asset returns are jointly multivariate normal, and independently and identically distributed through time. The economic models do not only rely on statistical assumptions but are also conditioned on assumptions concerning the investor's behaviour.

In the current study, we chose the CMR model on the strong recommendation that it delivers results on par with more sophisticated models such as CAPM or multi-factor models (Brown & Warner, 1980, 1985; MacKinlay, 1997). In agreement with this status quo, Campbell, Lo and MacKinlay (1996, p.154) say that: "This lack of sensitivity to the model choice can be attributed to the fact that the variance of the abnormal return is frequently not reduced much

by choosing a more sophisticated model." The CMR was used in other event studies for example, Ryan and Taffler (2004), as well as Stankeviþienơ and Akelaitisb (2014). Therefore, in keeping with the desirable principle of parsimony in model design, our preferred benchmark framework was the constant mean of the market model. Abnormal returns are aggregated in order to draw overall inferences from the event. In this study, we applied the time-series aggregation as per Equation 1.3:

$$\mathrm{CAR_i}(\mathrm{T_1}, \mathrm{T_2}) = \sum_{\mathrm{t=T_1}}^{\mathrm{T_2}} \mathrm{AR_{it}} \qquad (1.3)$$

$\mathrm{CAR_i}$ represents the Cumulative Abnormal Returns of market index i , from $\mathrm{T_1}$ to $\mathrm{T_2}$. The abnormal performance period is used to measure the effects of the event within the event window. The last step in Event Study Methodology is to test the null hypothesis that CAR are zero (a two-sided test). The main empirical investigation in this study was to test whether the stock price reacted to the announcement of the decision to host the individual major international sport tournaments in both South Africa and Morocco. We used the standard parametric test statistic in Equation 1.4, while Equation 1.5 defines the variance of CAR within the event window as:

$$\theta_1 = \frac{CAR_i(T_1,T_2)}{\sqrt{Var(CAR_i(T_1,T_2))}} \sim N(0,1)\ , \qquad (1.4)$$

where

$$\mathrm{Var}(\mathrm{CAR_i}(\mathrm{T_1}, \mathrm{T_2})) = \sigma_{e_i}^2 = \frac{1}{L_1} \sum_{t=T_1}^{T_2} (AR_{it})^2 \qquad (1.5)$$

Econometric issues in Event Study Methodology

Given that Event Study Methodology is widely used to study the impact of price-sensitive events in financial markets, it is critical to ensure compliance with technical specifications and validated applications. Brown and Warner (1980), McWilliams and Siegel (1997), as well as MacKinlay (1997) argue that the methodology depends on a set of assumptions that if not implemented correctly will lead to biased and imprecise empirical results. In this section, the design issues of Event Study Methodology are outlined.

Confounding effects: The methodology was based on the assumption that there were no confounding effects on the announcement date. Confounding effects refer to other factors unrelated to the event or fundamentals that may also induce a stock price reaction. There is always a strong possibility of unrelated concurrent events, and if not taken into account, will distort inferences from the results. Owing to the nature of our study, our concern is events that have the potential to impact the entire stock market (sources of systematic risk).

Examples of such events are economic growth; changes in regulations, fiscal or monetary policies; political issues; and industrial and environmental issues. In this article we minimised the problem by choosing a short event window, so that possible confounding effects could be identified and excluded. Following this approach, and systematically screening the event window, no confounding events were identified.

Identification of event date: It is important to identify the exact date when the market received the new information. Uncertainty of event date would make it difficult to specify correctly the period within which to analyse the impact of the event. In this article, the events of interest took place through scheduled public announcements by the respective sports administration bodies, the International Rugby Body (IRB), International Cricket Council (ICC), and FIFA. Consequently, there was no problem of event date uncertainty.

Time series frequency of security returns: The security returns are available at different sampling intervals, which could range from high frequency (monthly, quarterly, or annually) to low frequency (hourly, daily, weekly) data. Longer sampling intervals suffer from a lack of power compared with shorter intervals. MacKinlay (1997, p.34) states that, “there is a substantial payoff in terms of increased power from reducing the sampling interval”. Shorter sampling intervals, namely, daily returns, were chosen in the current study to benefit from the increased power.

Sample size: The sample size has implications on data distribution. The test statistic used in Event Study Methodology is based on the normality assumption associated with large samples. In this study, the estimation window was large enough and comprised 250 observations (approximately one trading year of returns). This is within the safe, and validated sample range (Brown & Warner, 1985).

Size of event window: Long event windows reduce the power of the test statistics. This reduction leads to false inferences from the significance of an event. A short event window is more likely to capture the significant effect of the event. To address this problem, the event window should be as short as possible, but long enough to capture leaks. In this study a window of (-20; +20).

Irregular time series intervals: Sometimes prices may be presented as having been recorded at the interval of one length, when in fact they have been recorded at the interval of other irregular lengths. For example, the daily prices of securities are ‘closing’ prices, prices at which the last transaction in all securities occurred. The issue is that the last transaction

does not occur at the same time for all securities, and some securities may not have traded on that day. This problem normally is critical when dealing with multiple firms, but not when dealing with indices, as is the case of the current study.

Even though we believe we addressed the typical econometrics issues associated with event studies, we further used an alternative model to allow for comparison of results. We chose a suitable model among a family of the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) models.

Econometric Model 2: EGARCH

Event Study Methodology (used in Model 1) is commonly applied and widely accepted as a workhorse for testing market responses to price-sensitive events. A recent review is 'Econometrics of Event Studies' by Kothari and Warner (2006). Nevertheless, some have expressed dissatisfaction with the Event Study Methodology's assumptions that the error terms of financial securities are uncorrelated (for example, Lo and MacKinlay, 1988; Wang, Salin, Hooker, & Leatham, 2002). This concern is raised because the idea of uncorrelated error terms in event studies is in conflict with the well-known *stylised facts* of security returns in finance (Cont, 2001), such as volatility clustering, fat-tailness, and asymmetries.

Although the presence of *stylised facts* of security returns is most probable, they remain an *empirical matter*, and an important one. Our study takes such model implications into consideration, and like Wang et al. (2002) we used a model that adjusted for GARCH, pioneered by Bollerslev (1986). GARCH relaxes the assumption of homoscedasticity in that it allows conditional variance to change as past residuals and variances change.

In this study we applied an extension of GARCH, the Exponential GARCH (EGARCH) proposed by Nelson (1991). The advantages of EGARCH include its built-in capacity to satisfy the non-negativity condition of variance, and its primary value of relaxing the constraint of volatility symmetry imposed by the basic GARCH. Researchers such as Corhay and Rad (1994) and Chu, Lin, as well as Prather (2005) support the use of GARCH-type models in event studies. In view of this and for the purpose of prudence and robustness, we supplemented Event Study Methodology with the EGARCH model.

To summarise, our objective was to test the stock market reaction to the hosting of mega-sport events, while taking advantage of EGARCH's capacity to control for variance changes, volatility asymmetry, and leverage effects. The model is estimated through a combination of the mean equations in Equation 2.1, and the variance equation in Equation 2.2:

$$y_t = \varphi_0 + \varphi_1 y_{t-1} + \varphi_2 y_{t-2} + \varphi_3 x_t + \delta w_t + \varepsilon_t, \quad \forall\, t = 1, 2, 3 \ldots N \qquad 2.1$$

$$\varepsilon_t \sim N(0, h_t)$$

$$\log(h_t) = \omega + \alpha \left| \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} \right| + \lambda \frac{\varepsilon_{t-1}}{\sqrt{h_{t-1}}} + \beta \log(h_{t-1}) + \phi w_t \qquad 2.2$$

We estimated two univariate EGARCH (1, 1) models for each of the two market indices: the All Share Index (ALSI) of the JSE, and the Moroccan All Share Index (MASI) of the Casablanca Stock Exchange (CSE). The choice of lag was based on model performance and parsimony as recommended by model evaluation literature (Hansen & Lunde, 2005). In Equation 2.1, y_t is the daily compounded stock index return at time *t*. The data-generating process for the mean equation is autoregressive model, AR(*p*). The lag order of *p* was determined through the usual econometric procedures (Ljung–Box statistical text, and Schwarz Information Criterion). Similar to Kanas (1998), we found AR(2) to be optimal. The covariate, x_t is a control variable in the form of a dummy for the bank crisis that occurred from 2007 to 2010. The variable, w_t is a dummy for the event window. We tested three intervals of (-5, +5): (-10,+10), and (-20, +20) around the event day of '0', and this is an explanatory variable of interest for this study. Therefore, in Equation 2.1, δ is a parameter of primary focus.

In Equation 2.2, $\varepsilon_{t-1}$and h_{t-1} are the one-period ARCH and GARCH, respectively. The ω, α, λ, β, and ϕ are model coefficients to be estimated. The parameters, α, and λ are the volatility size (or symmetry) and sign (or leverage) effects of the EGARCH model, respectively. When $\lambda < 0$, this means that negative disturbances (bad news) increase volatility more than positive shocks (good news). If $\lambda > 0$, then positive shocks have more impact on conditional variance than negative shocks. For the case of $\lambda = 0$, the third term in Equation 2.2 disappears and there is no asymmetry or leverage effects in the data-generating process of conditional variance. The parameter, β measures persistence in conditional variance. The more β approaches the value one, then the more persistence is manifested in the system. This means that a shock can take a very long time before it subsides. To reiterate, the goal of this modelling was to test whether the hosting of a mega sport had an impact on stock market returns. In this regard, if the coefficients δ, and ϕ are significant (either one of them or both), then there is an effect.

Data Characteristics

Witt (1988) categorised a tournament as a major international sport tournament dependent on the large number of international visitors it attracts, revenue generated, and most importantly, its worldwide reputation. This study excluded small tournaments hosted in South Africa simply because they did not meet the criteria for a major international sport tournament as defined by Witt (1988). The study used log returns computed from established stock price indices: ALSI (JSE) and MASI (CSE). The historical prices were obtained from Bloomberg market data.

Regarding Event Study model, we first discarded the last 20 data points prior to the event day to avoid possible confounding events. Then we considered 291 observations of daily log returns to be analysed into two time periods. The estimation of normal performance was conducted on a sample size of 250 within the estimation window of (-291, -20). The estimation of abnormal performance was tested within the event window of (-20, +20) with 41 observations. The event was assigned a time period of '0', the day of event announcement. If an announcement date fell on a non-trading day (weekend or public holiday), the next trading day was taken as the event date. Owing to national interest, the announcements of bid-winners of host countries in mega sports are publicly available and easily cross-validated from the relevant sport governing bodies, as summarised in Table 1.

TABLE 1 ABOUT HERE

There is an important observation on the data design for estimating the two models, the Event Study, and EGARCH. For the Event Study Methodology, the time series was arranged on the event timeline, while for EGARCH the time series was arranged on normal daily calendar time. The EGARCH data sample is for the period, 6 May 2003 to 27 May 2012, which amounts to 2227 observations. The information regarding the event announcement dates was confirmed with sources from the respective event organisers, the South African Rugby Union (SARU), FIFA and the ICC.

Empirical Results

Results of Event Study Model.

The results answer an empirical question of whether there was a stock price reaction to the announcement of hosting mega-sport tournaments, the 1995 Rugby World Cup, 2003

Cricket World Cup, South Africa's winning the 2010 FIFA World Cup bid, and Morocco's losing the bid. A parametric *t*-test was performed on CARs within the event window of (-20, +20) days. Table 2 presents the results. The stock market reacted positively to all the hosting *bid wins* (1995 Rugby World Cup, 2003 Cricket World Cup, and South Africa's winning the 2010 FIFA World Cup), and responded negatively to the hosting *bid loss* (Morocco).

TABLE 2 ABOUT HERE

By way of interpretation, the results in Table 2 show that over a period of 41 days around the announcement day, the CARs increased to 4.2%, 4.7%, and 10.5% for the 1995 Rugby World Cup, 2003 Cricket World Cup, and 2010 FIFA World Cup, respectively. The CAR plots allowed us to observe the movement of returns for the periods leading to the announcement, during the announcement, and after the announcement. The graphical presentation below allows us to further see if investors reacted before the announcement, immediately on the announcement day, or after the announcement. The early reactions might be due to investors expecting a good or bad announcement, while the delayed reactions might be due to investors not hearing the news immediately. The accumulation also allows us to make overall inferences from the impact of the announcement.

FIGURE 1 ABOUT HERE

Figure 1 captures the manifestation of market reaction to the bid announcement of winning or losing the opportunity to host mega-sport events: the 1995 Rugby World Cup, 2003 Cricket World Cup, South Africa's winning the 2010 FIFA World Cup bid, and Morocco's losing the bid to host the 2010 FIFA World Cup.

The JSE reacted positively to South Africa's securing the opportunity to host the 1995 Rugby World Cup. The returns decreased from day -20 to day -4 and made a sudden positive jump; then drifted upwards gradually in the post-event date period. There was a sudden jump of 21% three days before the announcement from -4.88% to -3.83% of CARs. This reaction is statistically significant at less than 1%. The price reaction before the announcement could mean the market predicted a positive announcement, especially as the 1995 Rugby World Cup was awarded to South Africa without the country submitting any bid. The JSE reacted positively to the opportunity to host the 2003 Cricket World Cup. Figure 1 shows an upward drift from day -20 to day -1 in the period before the announcement. This upward drift could imply that the market expected South Africa to win the bid, which was subsequently settled

by mutual arrangement. The plot also reflects a big jump up to six days after the announcement and a decline in the post-event period. This movement could be interpreted as the market having absorbed the news and settled back to normal performance range. The JSE reacted positively to South Africa's winning a competitive bid to host the 2010 FIFA World Cup. Figure 1 shows an upward and gradual drift from day -20 to day -2, with an immediate jump of 28% at day -1, one trading day before the announcement day. CARs increased from 9.67% to 12.45%. This reaction is statistically significant at less than 1% level. The returns declined in the post-event date period, showing that the market was beginning to settle back to its usual performance levels. The CSE reacted negatively to the news of Morocco's losing the opportunity to host the 2010 FIFA World Cup. The abnormal cumulative returns fell by 4.2% over a 41-day period around the announcement day, with a statistical significance of 1%. Figure 1 shows that CARs declined prior to the event date; thereafter there was an immediate big decline on the first trading day after the announcement day. The magnitude of the decline in CARs was significant, around 114% from -3.01% to -6.43%. The market tried to revert to a new stable performance in the post-event period.

On aggregate, the results in relation to the JSE reaction to an opportunity (by South Africa) to host a mega-sport event (in rugby, cricket, or soccer) are unambiguously positive and statistically significant at less than 1%. In contrast, the CSE responded negatively to the news of losing a competitive bid to host the FIFA World Cup. The results of this study are largely consistent with the existing literature from other countries on the impact of hosting major international sport tournaments, such as Dawson et al. (2004), Martins and Serra (2011), Nishio et al. (2009), and Sharma (2010).

Our findings appear to report a more decisive case of positive stock market reaction to the hosting of mega-sport events compared with a related South African study by Obi et al. (2009), who investigated the impact of the 2010 FIFA World Cup on the South African stock market. Their results were somewhat inconclusive. They found negative (significant) CARs prior to the announcement date, positive (insignificant) CARs during the event month, and positive (significant) CARs in the post-event period. This concludes the interpretation of results from Model 1, the Event Study Methodology. We now report the test results for the same research question but under a different method (Model 2) in which we relax the Event Study model's assumption of homoscedasticity of error terms.

Results of EGARCH Model

Table 4 reports the estimation output of Model 2, EGARCH. Column B presents results for the South African (JSE) stock market, while column C provides results for the Moroccan (CSE) stock market. Column A has a list of common covariates for both JSE and CSE EGARCH models. We used the EGARCH model to test the stock market response in the event windows defined as (-5,+5): (-10, +10), and (-20,+20). Each window is assigned an indicator of 1, and zero otherwie. Each window was tested both under the mean equation (2.1) and variance equation (2.2). We tested one window at a time. This meant that we ran exactly the same EGARCH specification three times. The results of this replication process are reported in Table 4. First, for South Africa's JSE, the event window coefficients for all windows, (-5, +5); (-10, 10); and (-20, +20) are positive under the mean equation (2.1), meaning an increase in returns, and insignificant under the variance equation. All are significant at less than one or five percent levels. Second, for Morocco's CSE, the coefficients for all event windows (-5, +5), (-10, +10), and (-20, +20) are negative for both mean equation (2.1), and variance equation (2.2), meaning a reduction in returns and volatility, respectively. All except the coefficient for window (-10, +10) are statistically significant.

TABLE 4 ABOUT HERE

There is a logical and consistent pattern that emerges from the results that the stock market reacted positively to the news of winning an event-hosting opportunity (South Africa), and that this positive reaction manifested in an increase in returns, while volatility dynamics were unaffected. The second pattern is that the stock market reacted negatively to the news of losing the opportunity to host a mega-sport event, and that this negative response appears in both returns and volatility reduction. Overall, the results of EGARCH (Model 2) are consistent with Event Study Methodology (Model 1) in that a positive effect is observed for the JSE in both models, and a negative effect is reported for the CSE in both models. Other variables in the model: the sign effect reports that bad news has greater impact than positive news ($\lambda < 0$) for the JSE, while in the CSE, the positive shocks ($\lambda > 0$) add more volatility than negative shocks. In both the JSE and CSE, conditional variances experience high persistence in that the coefficient, β, is close to 1.

In general, the empirical tests presented in this study show a price reaction associated with all the announcements. The study concludes that the economic activities associated with hosting major international sport tournaments in South Africa are deemed beneficial as viewed by the domestic stock market. Our results confirm the study of Mirman and Sharma (2010), who found significant impacts on the stock markets of bid-losers.

Investors' *ex ante* Expectations and the World Cup *ex post* Outcomes

> *Sport has the power to change the world. It has the power to inspire. It has the power to unite people in a way that little else does. It speaks to youth in a language they understand. Sport can create hope, where once there was only despair (Nelson Mandela's speech at the Laureus World Sports Awards, Monte Carlo, Monaco, 25 May 2000).*

Arguably, after South Africa's 1994 national elections which heralded the correction of past racial politics coupled with a sincere desire for progress towards social cohesion, the country stood to benefit from, inter alia, the claimed (see Mandela's words above) unifying clout of massive international sport events. This was evident in the country's persistence in hosting the 1995 Rugby World Cup, 2003 Cricket World Cup, followed by the 2010 FIFA World Cup, among others. Nevertheless, similar to other countries, bidding for a mega-sport event like the FIFA World Cup, these endeavours raised certain economic expectations which would have been discounted by the financial markets in accordance with Fama's (1965, 1970, 1991) EMH. The empirical results of positive investor reaction to the news of World Cup hosting were reported in the earlier parts of this article. This section re-visits this investor response, to interrogate the rationale for these results. In particular, we assess whether the South African stock market's perceived country benefits from hosting the FIFA World Cup were realised. In this regard, certain economic sectors and activities were touted as key beneficiaries, including construction, telecommunications, transportation, tourism, foreign investment, employment, tax revenues, and general economic growth. In view of this, questions of interest include: First, how does the JSE stock market's *ex post* response compare with the stock markets of other World Cup host countries? Second, do the *ex post* economic fundamentals of World Cup hosting support the observed stock market reactions?

FIGURE 2 - ABOUT HERE

Figure 2 shows how the domestic stock markets of countries that hosted the World Cup in the period 1990–2014 performed one month and 12 months after the tournament (Gunnarsson, 2018). It emerges that one month after the tournament, the South African stock market outperformed the Morgan Stanley Capital International World Index (MSCI) by 2.3% (compared with the average of 1.7% for other host countries), and sustained the improved performance at 4.1% in the 12 months after the FIFA World Cup. These numbers are a useful descriptive interpretation of *ex post* stock market performance, and they paint a consistent picture with the main econometric analysis in this article.

In order to calculate the *ex ante* economic assessment, the international consultancy firm, Grant Thornton, was contracted by the South African government. Initially (in 2003) they estimated the 2010 FIFA World Cup would have a general economic impact of ZAR25 billion and additional ZAR8.46 billion tax revenues, and they later (in 2008) expanded their predictions to ZAR60 billion of economic impact, ZAR21 billion of increased tax revenues, 381 000 additional jobs, and 480 000 incoming tourist visits (Allmers & Maenning, 2009). In tandem with experience in other host countries, these numbers were subsequently adjusted down, by and large, after the tournament.

FIGURE 3 ABOUT HERE

According to the South African government's final *ex post* report of the 2010 World Cup, a total of ZAR30.57 billion (South Africa, 2011) was ploughed into the entire tournament. Figure 3 shows how expenditure was distributed through different sectors. The report further states a total socio-economic impact (direct and indirect) of ZAR7.95 billion (South Africa, 2011), in the eight host cities (Johannesburg, Pretoria, Rustenburg, Polokwane, Bloemfontein, Durban, Cape Town, and Port Elizabeth). According to government figures, the number of foreign visitors to the 2010 FIFA World Cup in South Africa was 309 554 (South Africa, 2011), which generated a revenue of ZAR3.64 billion. Further, the report say that 130 000 jobs were created in construction, transport, and hospitality, leading to a total income of ZAR2 billion (South Africa, 2011), with a direct impact on poor households.

In order to assess whether the market expectations were misaligned with actual economic outcomes, it is important to consider global benchmarks. Some analysts specialising in computable general equilibrium modelling (Bohlmann & Van Heerden, 2008; Brunet, 2005; Madden, 2002; Sterken, 2006) found positive results in the impact evaluation of mega-sport events. Nevertheless, many studies, including those of Crompton (1995), Porter (1999), Szymanski (2002), Baade and Matheson (2004a, 2004b), Feddersen, Maennig, and Borcherding (2006), Feddersen, Grötzinger, and Maennig (2009), Maennig and Du Plessis (2007), Matheson (2009), Allmers and Maennig (2009), Preuss (2011), and Feddersen and Maennig (2012, 2013) cautioned that the often claimed high economic benefits linked to the hosting of mega-sport events are, by and large, small to modest, if present at all. In view of the above, and in comparing the *ex ante* and *ex post* information, it is clear that the 2010 World Cup was a success, and that the country did benefit from this hosting, but less than pre-event predictions. Indeed, some economists always held the view that "…given proper long-term planning and vision, FIFA 2010 could turn out to be the most profitable investment in this country's [South Africa] history" (Bohlmann & Van Heerden, 2008, p. 11).

Researchers in political science posit that the World Cup has the potential to benefit the African continent by reducing the historical Afro-pessimism, that is, hard to shake-off perceptions of underdevelopment, poverty, mismanagement and incapacity (Anholt, 2007; Lepp & Gibson, 2011). This negative image has the potential to limit business opportunities, including foreign investment. Dowse (2011, p. 12) observed that, "South Africa had been empowered by the event and gained significant social capital in the region [of Africa]."

By way of reconciling stock market expectations, *ex post* performance, and the World Cup economic fundamentals, a few observations may be noted. First, the organisation of the World Cup was a success in that logistics and preparations complied with FIFA requirements within the stipulated deadlines. Second, according to FIFA (2011b, p. 1), the global "television coverage of the competition reached over 3.2 billion people around the world", and "this represents an eight percent rise in the number of viewers recorded during the 2006 FIFA World Cup Germany". All these positive indicators are important for South Africa's reputation as first-time African host. Third, after considering the possible imperfections in quantifying the event's economic impacts (HSRC, 2011; South Africa, 2011), our observation is that the stock market has assessed the practical net present value of the World Cup after all relevant knock-on effects have dwindled, and has found these to be positive, though arguably moderate. Figure 3 shows that the portion of expenditure with high-opportunity cost (stadiums) constitutes only thirty percent of the total cost. The most important and necessary developments that probably would not have occurred (at all, faster, or of the same standard), include the comprehensively developed airports, road infrastructures, new bus service (Reya Vaya, a bus rapid transit system with designated traffic lanes), new high-speed partial underground train (the Gautrain), innovations in telecommunications, as well as other value-add services like safety and disaster management systems. The FIFA President summarised his post-tournament report as follows: "The 2010 FIFA World Cup in South Africa was not just successful from a sporting point of view ... it also underlined the immense social and cultural power of our game" (FIFA, 2011a, p. 7).

Conclusion

The study applied an Event Study Methodology and EGARCH model to investigate the stock market's reaction to the news of a home country's winning an opportunity to host a mega-sport event. The study was based on the 1995 Rugby World Cup, 2003 Cricket World Cup, and 2010 FIFA World Cup. In respect of the latter, we tested both the bid winner (South Africa) and the bid loser (Morocco). In the Event Study Methodology, the normal

performance was evaluated within the estimation period of (-291, -20), while the abnormal performance was tested within the event window of (-20, 20), using a parametric test. The EGARCH model was used to re-test the stock market response to the news of winning (by South Africa), and losing (by Morocco) the bid to host the 2010 FIFA World Cup. The test was replicated in three event windows (-5,5), (-10,10) and (-20,20). In both the Event Study Methodology and EGARCH model, our findings show a consistent positive stock market reaction to the home country's winning the opportunity to host a mega-sport event, and a negative stock market reaction to losing a bid to host a mega-sport tournament.

The results accord with related empirical studies indicating a positive correlation between hosting of mega-sport events and stock market reaction in developing countries owing to the necessary prioritised and massive infrastructural development that would otherwise not materialise. The findings of this study should benefit stock market investors, financial market, policy makers, and the sport industry.

References

Allmers, S. & Maennig, W. (2009). Economic impacts of the FIFA World Cups in France 1998, Germany 2006, and outlook for South Africa 2010. *Eastern Economic Journal*, *35*(4), 500–519.

Anholt, S. (2007). Brand Africa: What is competitive identity? *African Analyst*, *2*(2), 72–81.

Antón, A., Alonso, J. & Rodríguez, G. (2011). Mega-events impact on economic growth: Analysis of the South African World Cup. *African Journal of Business Management*, *5*(16), 6940–6948.

Baade, R.A. & Matheson, V. (2004a). The quest for the Cup: Assessing the economic impact of the World Cup. *Regional Studies*, *38*(4), 343–354.

Baade, R.A. & Matheson, V. (2004b). Mega-sporting events in developing nations: Playing the way to prosperity? *South African Journal of Economics*, *72*(5), 1084–1095.

Baade, R.A., Baumann, R.W. & Matheson, V. A. (2008). Assessing the economic impact of college football games on local economies. *Journal of Sports Economics, 9*(6), 628–643.

Bacon, F. & Von Gersdorff, N. (2008). U.S. mergers & acquisitions: A test of market efficiency. *Journal of Finance & Accountancy, 13*(1), 69–70.

Benkraiem, R., Louhichi, W. & Marques, P. (2009). Market reaction to sporting results: The case of European listed football clubs. *Management Decision*, *47*(1), 100–109.

Berman, G., Brooks, R. & Davidson, S. (2000). The Sydney Olympic Games announcement and Australian stock market reaction. *Applied Economics Letters, 7*(12), 781–784.

Bohlmann, H.R. & Van Heerden, J.H. (2008). Predicting the economic impact of the 2010 FIFA World Cup on South Africa. *International Journal of Sport Management and Marketing, 3*(4), 383–396.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, *3(*6), 307–327.

Brown, S.J. & Warner, J.B. (1980). Measuring security price performance. *Journal of Financial Economics, 8*(3), 205–258.

Brown, S.J. & Warner, J.B. (1985). Using daily stock returns. *Journal of Financial Economics, 14*(1), 3–31.

Brunet, F. (2005) The economic impact of the Barcelona Olympic Games, 1986–2004: Barcelona: The legacy of the Games, 1992–2002. *Working Paper* No. WP084. Barcelona: Centre d'Estudis Olímpics, Faculty of Economics and Business Science, Universitat Autònoma de Barcelona.

Campbell, J.Y., Lo, A.W. & MacKinlay, A.C. (1996). *The Econometrics of Financial Markets*. Princeton: Princeton University Press.
Cheng, M., Kang, W. & Tzeng, Z. (2011). The impact on non-macroeconomic events on Taiwan electronic industry stock index returns. *Global Economy and Finance Journal*, *4*(1), 80–101.
Chu, T.H., Lin, C.C. & Prather, L.J. (2005). Extension of security price reactions around product recall announcements. *Quarterly Journal of Business and Economics*, *44*(3), 33–48.
Cont, R. (2001). Empirical properties of asset returns: Stylized facts and statistical issues. *Quantitative Finance*, *1*, 223–236.
Corhay, A. & Rad, A.T. (1994). Statistical properties of daily returns: Evidence from European stock markets. *Journal of Business Finance and Accounting*, *21*(2), 271–282.
Cornelissen, S. (2004). 'It's Africa's turn!' The narratives and legitimations surrounding the Moroccan and South African bids for the 2006 and 2010 FIFA Finals. *Third World Quarterly*, *25*(7), 1293–1309.
Corrado, C.J. (2011). Event studies: A methodology review. *Accounting and Finance Journal*, *51*(1), 207–234.
Crompton, J. (1995). Economic impact analysis of sports facilities and events: Eleven sources of misapplication. *Journal of Sport Management*, *9*(1), 14–35.
Dawson, P., Kasimati, E. & Veraros, N. (2004). The 2004 Olympic Games announcement and its effect on the Athens and Milan stock exchanges. *Applied Economics Letters*, *11*(12), 749–753.
Demir, E. & Rigoni, U. (2017). You lose, I feel better: rivalry between soccer teams and the impact of Schadenfreude on stock market*. Journal of Sports Economics*, 18(1), 58–76.
Dick, C.D. & Wang, Q. (2008). The economic impact of Olympic Games: Evidence from stock markets. Centre for European Economic Research. *Discussion Paper* No. 08-060. Manheim: Centre for European Economic Research.
Dollesa, H. & Söderman, S. (2008). Mega-sporting events in Asia – Impacts on society, business and management: An introduction. *Asian Business and Management*, *7*(2), 47–162.
Dolley, J.C. (1933). Characteristics and Procedure of Common Stock Split-Ups. *Harvard Business Review, 11:* 316–26.
Dowse, S. (2011). Power play: International politics, Germany, South Africa and the FIFA World Cup. *Occasional Paper*, No. 82, May. Johannesburg: South African Institute of Foreign Affairs.
Edmans, A., Garcia, D. & Norli, O. (2007). Sport sentiment and stock returns. *The Journal of Finance*, *62*(4), 1967–1998.
Engelhardt, B., Matheson, V., Yen, A. & Chisolm, M. (2018). The economic impact of Olympic Games: effects of host country announcements on stock market returns. *International Journal of Sport Finance,* 13(3), 243-261.
Fama, E.F. (1965). The behavior of stock-market prices. *Journal of Business, 38*(1), 34–105.
Fama, E.F., Fisher, L., Jensen, M.C. & Roll, R. (1969). The Adjustment of Stock Prices to New Information. *International Economic Review*, 10(1): 1-21.
Fama, E.F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, *25*(2), 383–417.
Fama, E.F. (1991). Efficient capital markets II. *The Journal of Finance*, *46*(5), 1575–1617.
Feddersen, A. & Maennig, W. (2012). Sectoral labour market effects of the 2006 FIFA World Cup. *Labour Economics*, *19*(6), 860–869.
Feddersen, A. & Maennig, W. (2013). Mega-events and sectoral employment: The case of the 1996 Olympic Games. *Contemporary Economic Policy*, *30*(3), 580–603.
Feddersen, A., Grötzinger, A.L. & Maennig, W. (2009) Investment in stadia and regional economic development – Evidence from FIFA World Cup 2006. *International Journal of Sport Finance*, *4*(4)*,* 221–239.
Feddersen, A., Maennig, W. & Borcherding, M. (2006). New stadia for the World Cup 2006 in Germany: Is the novelty effect big enough? *International Journal of Sport Finance*, *1*(3), 174–188.
FIFA. (2002). The 2010 FIFA World Cup: Bidding process opens. *Media Release*, 23 October.
FIFA. (2007). Rotation ends in 2018. *Media Release*, 29 October.

FIFA. (2011a). Financial Report 2010, presented at the 61st FIFA Congress, Zurich, Switzerland, 31 May–1 June.
FIFA. (2011b). Almost half the world tuned in at home to watch 2010 FIFA World Cup South Africa. *Media Release*, July 11.
Floros, C. (2010). The impact of the Athens Olympic Games on the Athens stock exchange. *Journal of Economic Studies*, *37*(6), 647–665.
Godinho, P. & Cerqueira, P. (2018). The impact of expectations, match importance, and results in the stock prices of European football teams. *Journal of Sports Economics*, 19(2), 230–278.
Golez, B. & Koudijs, P. (2018). Four centuries of return predictability. *Journal of Financial Economics*, *127*(2), 248–263.
Gratton, C., Shibli, S. & Coleman, R. (2006). The economic impact of major sports events: A review of ten events in the UK. *The Sociological Review*, *54*(2), 41–58.
Grossman, S.J. & Stiglitz, J.E. (1980). On the impossibility of informationally efficient markets. *The American Economic Review*, *70*(3), 393–408.
Gunnarsson, B.B. (2018). The economics of World Cup 2018*. Islandsbanki Research Report*, May.
Hansen, P.R. & Lunde, A. (2005). A forecast comparison of volatility models: Does anything beat a GARCH (1, 1)? *Journal of Applied Econometrics*, *20*(7), 873–889.
Hayward, M.L.A. (2002). When do firms learn from their acquisition experience? Evidence from 1990–1995. *Strategic Management Journal*, *23*(1), 21–40.
Hill, H.H. (2000). Mega-events, urban boosterism and growth strategies: An analysis of the objectives and legitimations of the Cape Town 2004 Olympic bid. *International Journal of Urban and Regional Research*, *24*(2), 439–458.
HSRC (Human Sciences Research Council). (2011). FIFA 2010 World Cup legacy audit: Final report. *Report prepared for the Department of Sport and Recreation, Republic of South Africa*, May.
Jensen, M.C. (1978). Some anomalous evidence regarding market efficiency. *Journal of Financial Economics*, *6*(2), 95–101.
Kanas, A. (1998). Volatility spillovers across equity markets: European evidence. *Applied Financial Economics*, *8*(3), 245–256.
Kaplanski, G. & Levy, H. (2010). Exploitable predictable irrationality: The FIFA World Cup effect on the U.S. stock market. *Journal of Financial and Quantitative Analysis*, *45*(2), 535–553.
Kasimati, E. (2003). Economic aspects and the Summer Olympics: A review of related research. *International Journal of Tourism Research*, *5*(6), 433–444.
Kothari, S.P. & Warner, J. B. (2006). Econometrics of event studies. In B. Espen Eckbo (Ed.), *Handbook of corporate finance: Empirical corporate finance*, *Vol. 1* (pp.3– 36). Amsterdam: North Holland.
Kun, S.I., Dow, K.W. & Grover, V. (2001). Research report: A re-examination of IT investment and the market value of the firm: An event study methodology. *Information Systems Research Journal*, *12*(1), 103–117.
Lee, P.M. (2001). What's in a name.com? The effects of 'com' name changes on stock prices and trading activity. *Strategic Management Journal*, *22*(8): 793–804.
Leeds, M.A., Mirikitani, J. M. & Tang, D. (2009). Rational exuberance? An event analysis of the 2008 Olympic announcements. *International Journal of Sport Finance*, *4*(1), 5–15.
Lepp, A. & Gibson, H. (2011). Reimaging a nation: South Africa and the 2010 FIFA World Cup. *Journal of Sport & Tourism, 16*(3), 211–230.
Lintner, J. (1965). The valuation of risky assets and the selection of risky investments in stock portfolios and capital budgets. *Review of Economics and Statistics, 47*(1), 13–37.
Liu, Y. (2011). The 2000 and 2008 Olympic host announcements and Chinese stock market response. *International Journal of Applied Economics*, *8*(2), 43–62.
Lo, A.W. & MacKinlay, A.C. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *Review of Financial Studies*, *1*(1), 41–66.
MacKinlay, A.C. (1997). Event studies in economics and finance. *Journal of Economic Literature, 35*(1), 13–39.

Madden, J.R. (2002). The economic consequences of the Sydney Olympics: The CREA/Arthur Andersen study. *Current Issues in Tourism*, *5*(1), 7–20.
Maennig, W. & Du Plessis, S. (2007). World Cup 2010: South African economic perspectives and policy challenges informed by the experience of Germany 2006. *Contemporary Economic Policy*, *25*(4), 578–590.
Martins, A.M. & Serra, A.D. (2011). Market impact of international sporting and cultural events. *Journal of Economics and Finance*, *35*(4), 382–416.
Matheson, V. (2009). Economic multipliers and mega-event analysis. *International Journal of Sport Finance*, *4*(1), 63–70.
McWilliams, A. & Siegel D. (1997). Event studies in management research: Theoretical and empirical issues. *Academy of Management Journal*, *40*(3), 626–657.
Mirman, M. & Sharma, R. (2010). Stock market reaction to Olympic Games announcement. *Applied Economics Letters, 17*(5), 463–466.
Mlonzi, V.F., Kruger, J. & Nthoesane, M.G. (2011). Share price reaction to earnings announcement on the JSE-AltX: A test for market efficiency. *Southern Business Review*, *15*(3), 142–166.
Muth, J.F. (1961). Rational expectations and the theory of price movements. *Econometrica, 29*(3), 315–335.
Nauright, J. (2004). Global games: Culture, political economy and sport in the globalised world of the 21st century. *Third World Quarterly*, *25*(7), 1325–1336.
Nelson, D.B. (1991). Conditional heteroskedasticity in asset returns: A new approach. *Econometrica*, *59*(2), 347–370.
Nishio, T., Lim, C. & Downward, P. (2009). Analysing the economic impact of the Olympics using stock market indices of host countries. In R. S. Anderssen, R. D. Braddock, & L.T.H. Newham (Eds.), *Proceedings of the 18th World ISAM/MODSIM Congress* (pp. 1258–1264), *Cairns, Australia, 13–17 July*.
Obi, P., Surujlal, J. & Okubena, O. (2009). South African equity market reactions to the 2010 World Cup announcement. *African Journal for Physical, Health Education, Recreation and Dance*, *9,* Suppl. 1, 284–296.
Payne, B.C., Tresl, J. & Friesen, G.C. (2018). Sentiment and stock returns: anticipating a major sporting event. *Journal of Sports Economics*, 19(6), 843–872.
Philpott, M. F. & Firer, C. (1994). Share price anomalies and the efficiency of the JSE. *Investment Analysts Journal*, *23*(40), 39–51.
Porter, P.K. (1999). Mega-sports events as municipal investments: A critique of impact analysis. In J. Fizel, E. Gustafson, & L. Hadley (Eds.), *Sports economics: Current research* (pp. 61–73). Westport, CT: Praeger.
Preuss, H. (2011). A method for calculating the crowding-out effect in sport mega-event impact studies: The 2010 FIFA World Cup. *Development Southern Africa*, *28*(3), 367–385.
Ramdas, B., Van Gaalen, R. & Bolton, J. (2015). The announcement impact of hosting the FIFA World Cup on host country stock markets. *Procedia Economics and Finance*, *30*(1), 226–238.
Roche, M. (2000). *Mega-events and modernity: Olympics and expos in the growth of global culture*. New York, NY: Routledge.
Ross, S.A. (1977). The arbitrage theory of capital asset pricing. *Journal of Economic Theory, 13*(3), 341–360.
Ryan, P. & Taffler, R.J. (2004). Are economically significant stock returns and trading volumes driven by firm-specific news. Releases? Journal of Business Finance and Accounting, 31(1), 49-82.
Samitas, A.G. & Kenourgios, D.F. (2004). Market efficiency and signaling: An event study analysis for Athens Stock Exchange. *Proceedings of the 1st Applied Financial Economics (AFE) International Conference on Advances in Applied Financial Economics* (pp. 163–175), *Samos, Greece, 28–30 May*.
Sharma, R. (2010). Stock market impact of the International Cricket Council's decision to reallocate 2011 World Cup matches. *Sport in Society*, *13*(6), 1027–1034.
Sharpe, W.F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance*, *19*(3), 425–442.

Smith, B. & Krige, N. (2010). National sporting success and investor optimism. *University of Stellenbosch Business School (USB) Leaders' Lab, 4*(2), 18–21.
Smith, G. & Dyakova, A. (2014). African stock markets: Efficiency and relative predictability. *South African Journal of Economics*, *82*(2), 258–275.
South Africa. Department of Sport and Recreation. (2011). *The 2010 FIFA World Cup country report.* Pretoria: SRSA.
Stankeviþienơ, J. & Akelaitisb, S. (2014). Impact of public announcements on stock prices: relation between values of stock prices and the price changes in Lithuanian stock market. *Procedia: Social and Behavioral Sciences*, 156, 538-542.
Sterken, E. (2006). Growth impact of major sporting events. *European Sport Management Quarterly*, *6*(4), 375–389.
Szymanski, S. (2002). The economic impact of the World Cup. *World Economics*, *3*(1), 169–177.
Van Wyk, J. (2008). The 2010 FIFA World Cup in South Africa: The politics of hosting a mega international event. *World Journal of Managing Events*, *2*(1), 1–9.
Wang, Z., Salin, V., Hooker, N.H. & Leatham, D. (2002). Stock market reaction to food recalls: A GARCH application. *Applied Economics Letters*, *9*(15), 979–987.
Witt, S.F. (1988). Mega-events and mega-attractions. *Tourism Management*, *9*(1), 76–77.

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